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ABSTRACT

The Music Technology and Resource Center at Northern Colorado University's School of Music provides students access to advanced technology in music recording, composition, and performance; allows exploration of the use of computers and interactive computer technology in teaching music, and serves as a resource for music educators and students throughout the region. It offers equipment and personnel capable of developing interactive, learner-directed courses of study, and evaluates and implements existing software. The center's four primary goals are to: (1) expand and improve the instruction of the university's music students, particularly those who will teach in elementary or secondary schools; (2) offer a learning environment for regional music educators and elementary school teachers for achieving and maintaining currency in a variety of music programs; (3) use and continue to provide state-of-the-art technical equipment and software to develop cultural activities for elementary and secondary students, particularly in remote areas; and (4) promote critical research and development in music technology. (MSE)

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University of Northern Colorado
School of Music

Music Technology and Resource Center

A Report
Submitted to

AASCU/ERIC Model Programs Inventory Project

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AASCU/ERIC Model Programs Inventory Project

The AASCU/ERIC Model Programs Inventory is a two-year project seeking to establish and test a model system for collecting and disseminating information on model programs at AASCU-member institutions--375 of the public four-year colleges and universities in the United States.

The four objectives of the project are:

- To increase the information on model programs available to all institutions through the ERIC system
- To encourage the use of the ERIC system by AASCU institutions
- To improve AASCU's ability to know about, and share information on, activities at member institutions, and
- To test a model for collaboration with ERIC that other national organizations might adopt.

The AASCU/ERIC Model Programs Inventory Project is funded with a grant from the Fund for the Improvement of Postsecondary Education to the American Association of State Colleges and Universities, in collaboration with the ERIC Clearinghouse on Higher Education at The George Washington University.

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Abstract

The Music Technology and Resource Center at the UNC School of Music is a comprehensive project designed to offer students exposure to the state of the art in music recording, composition and performance technology, to explore and maximize the uses of computers and interactive computer technology in teaching music, and to serve as a resource for music educators and students throughout the region.

The objective of this project is to integrate computer techonology and interactive media with the teaching and learning of music history, music theory and composition, and instrumental music performance. To achieve this objective, the project purposes to establish a nucleus of equipment and personnel capable of developing interactive, learner-directed courses of study in the areas mentioned, as well as evaluating and implementing existing software.

The above activities will support four primary goals. First, the Music Technology and Resource Center will expand and improve the instruction of UNC's music students, particularly those who will teach in grades K-12. Second, the Center will offer a learning environment for regional music educators and elementary school teachers to assist them in achieveng and maintaining currency in a variety of music programs. Third, the Center will utilize and continue to provide state-of-the-art technological equipment and software to develop avenues for providing cultural activities for K-12 students, particularly those in remote areas within the Rocky Mountain Region. Fourth, the Center will provide equipment and materials for critical research and development in music technology.

Introduction

One of the great strengths of computers is their versatility, their suitability for application in virtually any activity or action where calculations are required, or where specific actions can be represented by calculations. As a result, digital computing devices of one sort or another may be found almost wherever one cares to look: in cars (most late-model cars have several), in stereo systems, in household appliances, in toys of all descriptions.

The proliferation of computers in schools and universities closely parallels their spread in society at large. Once exculsively the tools of the hard sciences, computers are now being used to advance and teach the most subjective subjects and disciplines, including music. The purpose of the Music Technology and Resource Center is to provide a laboratory of computer hardware and software in which students, faculty and music educators can explore the possibilities of the powerful new technological tools in their application to music and music education.

The following report provides an exposition of the various elements of the Music Technology and Resource Center. The Center's design includes equipment and facilities for computer-assisted instruction in music history, theory and keyboard skills, interactive video instruction, computer-assisted music composition and performance via MIDI (Musical Instrument Digital Interface), and professional audio and video recording and editing capability. Each element, along with its anticipated utility in addressing educational needs, is briefly discussed.

Background

Today's technological advances, including the many ramifications of computerization, have changed virtually every aspect of American life and have revolutionized many fields and industries, from manufacturing to music. These changes may well exact a heavy price from the unprepared. A profitable manufacturing plant can swiftly lose its ability to compete if it does not implement such systems as computer-aided design, computer-aided manufacture, computerized inventory and shipping control -- any of a host of computer applications that are setting the pace of quality and productivity in industry.

While music -- with its emphasis on masterpieces of the past and its creative performance nature -- represents the antithesis of a manufactured, mass-produced item, the world of music, too, has been revolutionized by computerization. A school of music must prepare its students for encounters with today's technology and the technology of the future. The School must allow students to explore the new avenues of sound and creativity opened up by such breakthroughs. It must help them gain experience necessary to utilize new tools for study of the past, present and future aspects of their art, and must help them explore the possible uses of these tools in teaching others. And finally, the school must serve as a resource for the community and outlying areas to foster appreciation and knowledge of the products and capabilities of music technology. These needs formed the basis for and define the future course of the Music Technology and Resource Center.

Description

The total project involves remodeling and converting a large multipurpose classroom into a state-of-the-art sound/video recording studio, constructing an addition to the existing music facility (Frasier Hall) to provide space and equipment for interactive video instructional capabilities, an electronic piano laboratory, a state-of-the-art computer-assisted instruction laboratory, and an enhanced audio/video equipped performance-laboratory facility.

During the first year of the grant period, architectural/design plans will be completed, with the advice and counsel of appropriate personnel and consultants. Bids will be requested for equipment for the facility, and funds will be encumbered for purchase of equipment for the Center. Consultants also will be employed the first year to start operations of the newly acquired equipment.

The second year, Phase I of the facility will be constructed and equipment will be installed. During years three and four, with the facility completed and equipment installed, visiting professors will be employed in the areas of interactive video and computer-assisted instruction programming. The mission of the visiting faculty will be to provide in-service instruction for UNC faculty, staff and students, public school faculty and administrators and others. By year five, specified UNC faculty will be prepared to accept assignments in the Music Technology and Resource Center as a part of their teaching loads. Personnel required for the project (in addition to existing UNC personnel) will include a recording engineer and a computer programmer/instructor. Total cost of the project is budgeted at $2.6 million.

The proposed project has four primary goals:

Goal One. ***The Music Technology and Resource Center will expand and improve the instruction of UNC's music students.*** The center will facilitate computer/video-assisted instruction in:

- Music appreciation, music history and literature
- Music educational principles, practices and philosophy
- Music fundamentals
- Aural skills (ear training, sightsinging)
- Music theory and composition
- Keyboard skills

UNC's computer-assisted instruction laboratory will be used to teach teachers how to use Computer Assisted Instruction (CAI) systems. CAI, while not replacing an instructor, extends and enhances the effectiveness of an instructor in numerous ways.

A major advantages of computer-assisted instruction is that it allows a student to learn at his or her own pace. This approach allows less well-prepared students to progress at their own rates, devoting extra time to specific areas with excellent instructional supportive materials and equipment, without making excessive demands on the instructor's time. Accelerated students can demonstrate mastery of familiar materials and progress to more advanced studies. CAI provides excellent opportunities for repetitive drill for learners at all levels as well as avenues

for pursuit of special interests and breadth of knowledge. CAI is especially useful in teaching the fundamentals of music, including music theory, sight-singing, melodic and harmonic dictation, keyboard harmony, error identification in music performances and style identification.

Interactive video (the combination and interactions of visual images and audio signals from a laserdisc with a computer program) represents one of today's most sophisticated teaching tools. IAV is especially effective when applied to the teaching of music appreciation and history, using films of historic paintings, manuscripts, clothing, instruments and structures relating works of music to the civilizations that fostered them. IAV allows students to have immediate visual feedback and instruction in many areas. It is, in essence, computer-assisted instruction using visual examples. An important activity of the Center will be the preparation of IAV packages.

Video recordings provide music teachers and students with immediate feedback for the evaluation and improvement of analytical and performance skills. It also provides teachers with the opportunity to prepare and record lessons and workshops for students. Video instruction is especially valuable in providing students with immediate feedback on the appearance of their work. Conductors rely on it, and performers use it to polish everything from basic technique to stage presence. When connected with a long-distance transmission system (satellite or microwave, for instance) it makes possible the instruction and evaluation of teachers across the state in their work with all of the performing arts. UNC's video instruction laboratory will be used to supplement class instruction and CAI and to teach current and future educators how to film, edit and produce video recordings from basic through advanced levels. The video laboratory and library will also provide students and the community with access to a library of videotapes ranging from performances by the Metropolitan Opera to tapes in instrumental and vocal pedagogy.

The Center will provide an opportunity for students to have direct experience in critical aspects of music technology, including audio and video recording and computer synthesis. UNC's fully equipped audio/recording studio control room will include a 24-channel fully automated mixing console, a 24-track recorder, a two-track recorder and a wide variety of audio signal processing equipment. The audio recording studio will provide student performers with excellent preprofessional experience as studio musicians. Courses and workshops in recording engineering will teach educators, current and future, how to record their ensembles and classes. The studio will provide students with important hands-on music business experience.

Computer music synthesis addresses a creative aspect of the art of music. It allows the user to produce music compositions that can be performed immediately on state-of-the-art synthesizers and printed as sheet music. The UNC Computer Music Synthesis laboratory will provide state-of-the-art synthesizers, tape decks, piano keyboards, drum machines and other peripherals, equipping students with the tools necessary to develop modern composition skills. The aesthetic, creative experience of composing is especially enhanced by the immediate feedback provided by computer synthesis and printing.

Goal Two. ***The Center will offer a lifetime learning environment for regional music educators and elementary school teachers to assist them in achieving and maintaining currency in a variety of music programs. The center also will provide K-12 educators who are not music specialists, yet are charged with basic music instruction, with excellent materials and techniques appropriate to***

their level of expertise for instruction of music appreciation and music fundamentals.

The Music Technology and Resource Center will provide computer/video-assisted opportunities for in-service training programs during the academic year and summer in the areas of music appreciation, music history and literature, music fundamentals, computer-assisted instruction, interactive videodisc instruction, electronic keyboard instruction, video instruction, audio recording, computer synthesis and computer management tools.

- The Center will provide access to the most current computer hardware/software, video tapes and videodiscs for K-12 faculty and students.
- Clientele will have access to a library of current software, video tapes and videodiscs.
- The Center will serve as a test center for new computer hardware, software, videos and videodiscs.
- Educators and students will have opportunities to attend special workshops introducing state-of-the-art tools for music instruction and performance.
- Teachers will learn how to enhance their effectiveness through computer-assisted instruction

The Center will facilitate an expansion of UNC's current faculty outreach program. UNC faculty members will be able to use the latest technological tools to address specific needs of public school teachers. The Center will possess the necessary personnel and equipment to develop video tapes and software to solve many commonly encountered problems in the sequential learning process. These may range from the imparting of an appreciation of musical masterpieces and their creators to the techniques of performance, composition, recording, printing and distributing of instructional and performance materials.

The Center also will provide the potential for an innovative exchange program in which selected regional public school teachers could entrust their classes to qualified UNC graduate students for a designated period of time (ranging possibly from two days to two weeks), allowing the teachers to have access to the Technology and Resource Center for hands-on experiences and training.

Goal Three. ***The Music Technology and Resource Center will utilize and continue to provide state-of-the-art technological equipment and software to develop avenues for providing cultural activities for K-12 students, particularly those in remote areas within the Rocky Mountain Region.*** One of the most exciting and promising outcomes of the Music Technology and Resource Center will be the establishment of a library of computer software and video tapes, including commercial video tapes and laserdiscs, as well as performances by UNC ensembles (many of them nationally acclaimed), and master classes, workshops and demonstrations by UNC's outstanding faculty members. The project will explore methods for remote access for public school clientele to Music Technology and Resource Center equipment and materials by way of modems and telecommunications -- currently a high priority for the University of Northern Colorado.

The UNC School of Music hosts more than 5,000 students each year in festivals, clinics and symposia. The Center will provide video and sound recording opportunities for regional public school music directors and ensembles who wish to use the facilities. The Music Technology and Resource Center also will expand on-campus activities to include events for students who have

special interests in computer and recording workshops.

Goal Four. ***The Center will provide equipment and materials for critical research and development in music technology, especially as it pertains to K -12 education.*** The Center will facilitate research and development in:

- Application of computer technology to music educational research
- Videodisc instruction
- Utilization of video and audio recording in teaching

Results

Reports on the activities and effectiveness of the Music Technology and Resource Center will be forthcoming as the program is implemented. Evaluations will be based upon reactions of students, faculty and consultants to the technology and activities of the Center, and upon the success and acceptance of the Center's products.

Conclusions and Recommendations

Since the Center is, at this writing in August 1989, in its earliest stages of implementation, any conclusions and recommendations would be speculative. Conclusions and recommendations regarding the effectiveness of the Music Technology and Resource Center and its viability for replication will be contained in future reports.